

# Tool Joints Adapted for Electrical Transmission

## Abstract

Connectable tool joints which are adapted for electrical transmission without increasing their cross-sectional area adjacent their respective secondary shoulders. The tool joints comprise a plurality of threads intermediate primary and secondary shoulders. The tool joints further comprise a cross-sectional area adjacent their respective secondary shoulders that act cooperatively to withstand an overload condition of the connected tool joints during operation. Openings within the cross-sectional area adjacent the secondary shoulders comprise a volume that is more than 50% less than what is required to fail the secondary shoulder adjacent the opening during an overload condition of the tool joint. The respective openings are adapted to receive electrical transmission elements, and when the tool joints are connected, the respective elements are substantially aligned to enable electrical transmission across the connected tool joints. The electrical transmission elements are suitable for transmitting power and or data along the drill string between surface and subterranean equipment.